

REMARKS

Claims 1 and 5-19 are all the claims presently being examined in the application. Applicant has added new claim 19 to more particularly define the invention.

With respect to the prior art rejections, claims 1, 7-9, and 11-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sasuga, et al. (U.S. Pat. No. 5,680,183) in view of Hashimoto (U.S. Pat. No. 5,442,470). Claims 5, 6, and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sasuga, et al. in view of Hashimoto and further in view of Toshiya et al. (JP 06-051308 A).

These rejections are respectfully traversed in view of the following discussion.

It is noted that the amendments are made only to more particularly define the invention and not for distinguishing the invention over the prior art, for narrowing the scope of the claims, or for any reason related to a statutory requirement for patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

I. THE CLAIMED INVENTION

Applicant's invention, as disclosed and claimed, for example by claim 1, is directed to a liquid crystal display panel.

The display panel includes a liquid crystal display panel held between an upper frame and a lower frame, the upper frame including a display window. The upper frame and the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion.

One of the upper and lower frames includes a first stepped protrusion formed in the vicinity of its end, and the other frame of one of the upper and lower frames has a second stepped protrusion formed in the vicinity of its end. The second stepped protrusion is fitted inside the first stepped protrusion. The first stepped protrusion and the second stepped protrusion are formed to differ from each other in a protruding direction. (See Page 3, lines 19-24; Page 5, lines 3-7; Page 7, lines 4-20; Page 8, lines 14-16; Page 10, lines 14-27; Page 11, lines 15-24; Page 12, lines 11-25; and Figures 3, 4 and 7).

Similarly, independent claim 11 is directed to a liquid crystal display including a foldable frame comprising an upper frame portion and a lower frame portion which are continuously formed of a resin material and separated by a U-shaped portion. The foldable frame further comprises a first stepped protrusion formed in the vicinity of a first end and a second stepped protrusion formed in the vicinity of a second end, the second stepped protrusion is fitted inside said first stepped protrusion. The first stepped protrusion and the second stepped protrusion are formed to differ from each other in a protruding direction. (See above).

Further, independent claim 5 is directed to a method of fabricating a liquid crystal display having a liquid crystal display panel held between an upper frame and a lower frame, the upper frame having a display window, including integrally molding the upper frame and the lower frame such that the upper frame and the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion, and vacuum forming the upper frame and the lower frame of the same resin material. The upper frame and the lower frame comprise a plurality of stepped protrusions. (See above).

Conventional liquid crystal displays include a lower frame, an upper frame and an

protrusions or foldable U shaped portions. However, the conventional displays with the large variety of parts and materials tends to increase manufacturing complexity and errors in positioning parts during assembly, and thus increase the cost of parts and labor. (See Page 2, lines 1-9; Page 3, lines 3-9; and Figures 1 and 2).

An aspect of the present invention includes the upper frame and the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion These aspects facilitate fixing the upper and lower frames together by improving the position accuracy between the side covering of the top surface of the liquid crystal display and the side covering the bottom surface of the backlight. Accordingly, this configuration integrates the handling of these parts as well as eliminates the need for additional parts machined into the frame whereby the parts count is decreased. (Page 5, lines 13-15; Page 8, line 14 - Page 9, line 13; Page 11, lines 15-19; and Page 12, lines 14-25).

As a result of this inventive structure, a liquid crystal display is provided with a reduced profile, size, weight and cost. (See Page 3, lines 3-9).

II. THE PRIOR ART REJECTIONS

A. The 103(a) Rejection Based on Sasuga, et al. in view of Hashimoto

First, the references, separately, or in combination, fail to teach, disclose or provide a reason or motivation for being combined. In particular, Sasuga, et al. ("Sasuga") pertains to a liquid crystal display with a conventional fixing member specifically directed to facilitating the repair and replacement of its back lights. (See Sasuga at Abstract; Column 1, lines 10-15; and Column 1, line 54-Column 2, line 11).

By contrast, Hashimoto. ("Hashimoto") does not have the same aim as Sasuga.

Hashimoto discloses a liquid crystal display device including “a liquid crystal panel and a circuit board for driving the liquid crystal panel are electrically connected through a flexible printed circuit.” Hashimoto is specifically directed to resolving the problem of “providing a suitable electrical insulation member for electrically isolating the metallic framework from a circuit board” through the use of a frame member having a substantially U-shaped cross-sectional shape. (See Hashimoto at Abstract; Column 1, lines 10-15; Column 2, lines 17-30 and 42-54).

Nothing within Hashimoto, which pertains to electrically isolating a metallic framework, suggests facilitating the repair and replacement of a back lights in a liquid crystal display device as disclosed in Sasuga. Further, Sasuga’s apparatus, including hooks and projections, are die molded, whereas Hashimoto’s frame member is injection or extrusion molded. Accordingly, one of ordinary skill would not mix conventional die molded technology with injection or extrusion molding technology. (See Hashimoto, Column 7, lines 15-26). Thus, Sasuga teaches away from being combined with another invention, such as, Hashimoto.

Therefore, one of ordinary skill in the art would not have combined these references, absent hindsight.

Second, even if combined, the references do not teach or suggest the features of independent claim 1, and similarly independent claim 11, including the upper frame and the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion the upper frame and the lower frame are coupled to each other via a foldable U-shaped portion. (See Page 3, lines 19-24; Page 5, lines 3-7; Page 7, lines 4-20; Page 8, lines 14-16; Page 10, lines 14-27; Page 11, lines 15-24; Page 12, lines 11-25; and Figures 3, 4 and 7).

Applicant agrees with the Examiner's assertion that Sasuga does not "explicitly disclose that the frames are vacuum formed of resin material" as well as "disclose that the upper frame and the lower frame are coupled to each other via foldable U-shaped portion." (See Office Action, Page 3, 3rd Paragraph; and Page 4, Section 2).

Further, for emphasis, Applicant asserts that the fixing hook (FK) and fixing projection (FKP) are more structurally and functionally equivalent to conventional fastening means not a stepped protrusion as suggested in the Office Action. Indeed, Sasuga's LCD for easy assembly and disassembly including conventional fixing hooks and fixing projections are die molded into the frame layers without any stepped protrusion as recited in claims 1 and 11 of Applicant's invention. (See Column 17, lines 1-20 and Figure 34).

In contrast, Applicant's protrusions are stepped shaped not hook and projection shaped as with the conventional Sasuga structure, thereby Applicant's protrusions may be integrated as a feature within the frame, and easily molded during production of the frame without being machined separately from the frame. Thus, this integrated feature further eliminates the need for expensive dies as disclosed in Sasuga. (See Page 8, line 14 - Page 9, line 6; Page 10, lines 24-27; Page 11, lines 1-5; Page 11, line 15 - Page 12, line 5; Page 12, lines 19-25; and Figures 3, 4 and 7).

Third, Hashimoto does not make up for the deficiencies of Sasuga.

Instead, Figure 2 of Hashimoto discloses a liquid crystal display device including a frame member having a substantially U-shaped cross-sectional shape without the frame member including a display window. Applicant respectfully asserts that the Examiner mischaracterizes Hashimoto because Hashimoto only discloses a substantially fixed frame member 8 (what the Examiner attempts to analogize to an upper frame and a lower frame separated by a U-shaped portion), which is molded by an injection, extrusion or some other

technique, to a specific substantially U shaped cross-sectional shape. In particular, “the liquid crystal panel 1 and the circuit board 3 preferably are held in a planar manner between the opposing inner surfaces of the frame member having a U-shaped cross-section.” This specific shape of the frame member 8 is used “to protect the flexible printed circuit.” In particular, Hashimoto is focused on providing a suitable electrical insulation member for electrically isolating the metallic framework from a circuit board” through the use of a frame member having a substantially U-shaped cross-sectional shaped frame of uniform thickness. Accordingly, the frame member 8 functions more like an insulation member whereas the “metallic framework” is more structurally and functionally equivalent to Applicant’s upper frame and lower frame. Thus, the frame member 8 is not an entire upper frame and a lower frame separated by a U-shaped portion where the upper frame includes a display window. (See Hashimoto at Abstract; Column 1, lines 10-15; Column 2, lines 17-30 and 42-54)

Indeed, for emphasis, the frame member 8 and the protected components, e.g., the liquid crystal panel 1 and circuit board 3, are likely to be set within a metallic framework, as indicated above, and thus the frame member 8 is structurally and functionally equivalent to a partial support member not an upper frame and a lower frame separated by a U-shaped portion as suggested in the Office Action. Accordingly, the frame member 8 does not include a display window, and thus Hashimoto does not include an upper frame with a display window as cited in Applicant’s claims. (See Column 2, lines 50-66; Column 5, lines 40-45-57; Column 7, lines 15-45; Column 9, lines 30-50; Column 10, lines 39-60; and Figures 2 and 5)

Please note, Hashimoto also does not teach or suggest any stepped protrusions in the frame member 8 as the frame member has a substantially uniform thickness (t) produced by the molding process. Indeed, Hashimoto only discloses that “[h]oles are provided in both

ends of each of the frame members. The four holes 11 can be used as mounting holes for mounting the entire liquid crystal display device on an apparatus and, at the same time, can be used as locating holes, which provide position references for correctly locating the frame members during attachment to panel. Accordingly, none of the holes are a protrusion. Thus Hashimoto does not teach or suggest any upper frame and a lower frame, let alone, an upper frame and a lower frame including a first stepped protrusion as cited in Applicant's claims.

In contrast, as indicated above, Applicant's invention discloses, teaches and suggests including that the upper frame and the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion. Since the U-shaped portion is part of the frame, the frame "can be vacuum formed , ..., into a configuration capable of folding." Indeed, the U-shaped portion "allow 180° folding with reference to the center of the U-grooved portion 13." Further, the U-shaped portion is integrally formed between the first stepped protrusion 15a and the second stepped protrusion 15b. Accordingly, the U-shaped portion is integrally molded with the protrusions 15a, 15b as part of the frame 1, which consists of the upper frame 1A and the lower frame 1B, to facilitate fixing the upper and lower frames. (See Page 9, lines 7-13; Page 10, lines 14-25; Page 11, lines 1-5 and 15-24; Page 12, lines 19-25; and Figures 4 and 5). Therefore, Applicant's invention includes the upper frame and the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion, whereas Hashimoto only teaches a liquid crystal device including a U-shaped frame member without any upper frame and a lower frame portion, let alone, an upper frame including a display window.

Accordingly, Hashimoto is focused on providing a suitable electrical insulation member for electrically isolating the metallic framework from a circuit board" through the use of a frame member having a substantially U-shaped cross-sectional shaped frame of

uniform thickness. (See Hashimoto at Abstract; Column 1, lines 10-15; Column 2, lines 17-30 and 42-54).

Consequently, the Hashimoto conventional structure is unsuitable for achieving at least one object of the invention, which is to facilitate fixing the upper and lower frames together by improving the position accuracy between the side covering of the top surface of the liquid crystal display and the side covering the bottom surface of the backlight. Thus, this structure integrates the handling of these parts as well as eliminates the need for additional parts machined into the frame whereby the parts count is decreased, and thus reduces cost, size and weight. (Page 5, lines 13-15; Page 8, line 14 - Page 9, line 13; Page 11, lines 15-19; and Page 12, lines 19-25).

Therefore, neither Sasuga nor Hashimoto discloses, teaches or suggests the features of independent claim 1, and similarly independent claim 11, of Applicant's invention, including the upper frame and the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion.

For at least the reasons outlined above, Applicant respectfully submits that neither Sasuga nor Hashimoto teach or suggest all of the features of the independent claims 1 and 11, and related dependent claims 7-9 and 12-18, which are patentable not only by virtue of their dependency from their respective independent claims, but also by the additional limitations they recite.

For the reasons stated above, the claimed invention, and the invention as cited in independent claims 1 and 11, should be fully patentable over the cited references.

B. The Toshiya Reference

Regarding claims 5, 6 and 10, to make up for the deficiencies of Sasuga and Hashimoto, the Examiner relies on Toshiya, et al. (“Toshiya”). Toshiya fails to do so.

First, Toshiya does not have the same aim as Sasuga or Hashimoto as discussed above, and the urged combination would not have been made, absent hindsight.

Toshiya is non-analogous art and discloses a liquid crystal display including a liquid crystal cell and illuminating means supported in a frame, which is focused on providing a “small-sized, thin and durable liquid crystal display device which is easy to assemble.” (See Toshiya at Abstract).

Nothing within Toshiya suggests facilitating the repair and replacement of a back lights in a liquid crystal display device as disclosed in Sasuga. Toshiya also does not suggest a “suitable electrical insulation member for electrically isolating the metallic framework from a circuit board” as disclosed in Hashimoto. As discussed above, Sasuga’s apparatus, including hooks and projections, are die molded, whereas Hashimoto’s frame member is injection or extrusion molded similarly with Toshiya’s vacuum molded supporting frame. Accordingly, one of ordinary skill would not mix die molded technology with injection, extrusion or vacuum molding technology. Thus, Sasuga and Hashimoto teach away from being combined with each other as well as another invention, such as, Toshiya.

Therefore, one of ordinary skill in the art would not have combined these references, absent hindsight.

Second, even if combined, Toshiya does not make up for the deficiencies of either Sasuga or Hashimoto as indicated above. That is, the references do not teach or suggest the features of independent claim 5, including integrally molding such that the upper frame and

the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion. (See Page 3, lines 19-24; Page 5, lines 3-7; Page 7, lines 4-20; Page 8, lines 14-16; Page 10, lines 14-27; Page 11, lines 15-24; Page 12, lines 11-25; and Figures 3, 4 and 7).

Toshiya is non-analogous art and discloses a liquid crystal display including a liquid crystal cell and illuminating means supported in a frame 3, with a light source 22 supported by and fixed to the frame 3 and a fixing means 5. The fixing means 5 includes a frame part 51 and crane wing part 55 integrated with the crane wing part 55. The frame part 51 is L-shaped where the crane wing part 55 is attached to the frame part 51 so as to bend when needed to access to the light source 22. Since the crane wing part 55 is somewhat elastic, it will conform to the original shape so that the fixing means 3 protects the light source 22 from external shock. ” Accordingly, the fixing means 5 is not U-shaped, let alone, the upper frame and the lower frame are separated by a U-shaped portion like Applicant’s invention. If the frame member 51 was separated, then the various components, e.g., the liquid crystal panel 1 and the circuit board 3 would not be held in place, and thus this would defeat the purpose of the frame member 51. (See Toshiya at Abstract; Paragraph [0006], [0010] and [0012]).

Therefore, Toshiya does not disclose, teach or suggest a foldable U-shaped portion, let alone, integrally molding such that the upper frame and the lower frame are continuously formed of a same resin material and are separated by a U-shaped portion as disclosed in Applicant’s invention.

Finally, according to claim 10, Applicant’s invention teaches that “a surface of the resin material comprises an antistatic agent.” This agent is “used to reduce the electrification of the liquid crystal display during assembly and the like. This allows an improvement in the

yield of the liquid crystal display.” (See Page 8, lines 3-7; and Page 10, lines 17-18). Please note that the Office Action does not provide any references or arguments to reject this claim, and Toshiya does not disclose, teach or suggest the features of claim 10, including any antistatic agent. Thus, Applicant traverses the rejection. Accordingly, claim 10 should be allowed. (See Office Action, Pages 4-5).

For at least the reasons outlined above, Applicant respectfully submits that none of Sasuga, Hashimoto or Toshiya teach or suggest all of the features of the independent claim 5, and related dependent claims 6 and 10.

Regarding dependent claims 6 and 10, these claims are patentable not only by virtue of their dependency from the respective independent claim, but also by the additional limitations they recite.

For the reasons stated above, the claimed invention, and the invention as cited in independent claim 5, should be fully patentable over the cited references.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1 and 5-19, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

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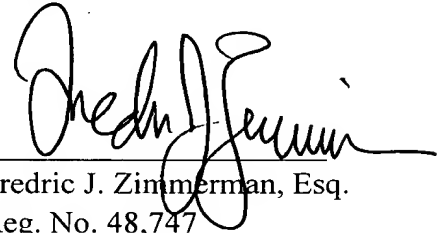
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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Date: _____

1/6/04

Respectfully Submitted,



Fredric J. Zimmerman, Esq.
Reg. No. 48,747

McGinn & Gibb, PLLC
8321 Old Courthouse Rd., Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254